

## CLAIMS

We claim:

1. An isolated nucleic acid encoding a polypeptide or a fragment thereof having galacturonosyltransferase (GalAT) activity.
2. The nucleic acid of claim 1 wherein the polypeptide or the fragment has approximately 50% amino acid sequence similarity with the corresponding sequence as set forth in SEQ ID NO: 2.
3. The nucleic acid of claim 2 wherein the amino acid molecule is selected from the group consisting of the sequences as set forth in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, and 50.
4. The nucleic acid of claim 3 wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO: 2.
5. The nucleic acid of claim 4 wherein the polypeptide is encoded by the nucleic acid sequence as set forth in SEQ ID NO: 1.
6. An isolated polypeptide or a fragment thereof having galacturonosyltransferase GalAT activity wherein the polypeptide or the fragment has approximately 50% amino acid sequence similarity with the corresponding amino acid sequence as shown in SEQ ID NO: 2.
7. The polypeptide or the fragment of claim 6 which comprises the amino acid sequence selected from the group consisting of the sequences as set forth in SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, and 50, or the corresponding sequence thereto.
8. The polypeptide or the fragment of claim 7 which comprises the amino acid sequence as set forth in SEQ ID NO: 2 or the corresponding sequence

thereto.

9. The polypeptide or the fragment of claim 7 wherein the amino acid sequence is encoded by the nucleic acid as set forth in SEQ ID NO: 1.
10. An antibody which specifically recognizes the polypeptide or the fragment of claims 7 or 8.
11. An expression vector comprising in operable linkage the nucleic acid according to any one of claims 1, 2, 3 or 5 and a plant-expressible promoter.
12. The expression vector of claim 11 wherein said promoter is heterologous to said nucleic acid.
13. A transgenic plant which has been transformed with the expression vector of claims 11 or 12.
14. A transgenic plant having modified pectin.
15. A transgenic plant having altered GalAT activity wherein the altered activity is due to a mutation in the *GALAT* gene.
16. Progeny of the transgenic plant of claims 13, 14 or 15.
17. Modified pectin isolated from the transgenic plant of claims 14 or 15.
18. A product comprising the modified pectin of claim 17.
19. A method of generating a plant with altered GalAT activity by mutating the *GALAT* gene.

20. A method of preparing a polymer comprising a galacturonic acid and a polymer with a GALAT protein under conditions suitable to form at least one covalent linkage between the galacturonic acid and the polymer.
21. The method of claim 20 wherein said polymer is selected from the group consisting of homogalacturonan, rhamnogalacturonan I, rhamnogalacturonan II, xylogalacturonan, apiogalacturonan or other galacturonic containing polymer.
22. The method of claim 21, wherein said polymer is homogalacturonan.
23. The method of claims 20 or 21 wherein the GALAT protein comprises the amino acid sequence as set forth in SEQ ID NO: 2 or a fragment thereof having GalAT activity.